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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,635	09/16/2003	Syamal K. Ghosh	86291RLO	1910

7590

06/01/2006

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EXAMINER

WOLLSCHLAGER, JEFFREY MICHAEL

ART UNIT

PAPER NUMBER

1732

DATE MAILED: 06/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/663,635

Applicant(s)

GHOSH ET AL.

Examiner

Jeff Wollschlager

Art Unit

1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

The amendment to claims 1, 10, and 11 filed April 11, 2006 has been accepted. Claim 2 has been cancelled. The 35 USC § 112, second paragraph rejection of claim 10 has been withdrawn.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3, 5, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi (European Patent Application 1 156 536; published November 21, 2001) as evidenced by the Compact Oxford English Dictionary in view of Van Slyke et al. (European Patent Application 1 274 136; published January 8, 2003).

Regarding claim 1, Shi teaches a method for forming a homogeneous mixture of powders of organic materials including at least one dopant component and one host component to provide a homogeneous mixture for forming a pellet for thermal physical vapor deposition producing an organic layer on a substrate for use in an organic light-emitting device comprising a) combining organic materials, such materials including at least one dopant component and one host component, b) providing a solvent with the organic materials to form a suspension of organic materials in the solvent, c) inherently mixing the suspension at a temperature sufficient to form a solution of the organic materials in the solvent; and d) evaporating the solvent from the solution leaving a homogeneous mixture of the organic powder (Abstract; paragraph [0033]) A suspension is defined as “a mixture in which particles are dispersed throughout a fluid” (Compact Oxford English Dictionary). Thus, when Shi forms a homogeneous mixture of a host and dopant in a solvent a suspension is formed.

Shi further teaches that the homogeneous mixture of organic powders forms a solid, single, evaporation source for thermal physical vapor deposition to produce an organic layer on a substrate for use in an organic light-emitting device (paragraphs [0028, 0038]; Figure 3), but does not teach that the mixture is compacted to form a pellet.

However, Van Slyke et al. teach a highly analogous method of compacting a homogeneous mixture of organic powders to form a pellet suitable for thermal physical vapor deposition to produce an organic layer on a substrate for use in an organic light-emitting device (paragraphs [0081-0083])

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to modify the method of Shi for forming a solid homogenous mixture of organic powders for thermal physical vapor deposition with the method of Van Slyke for forming a pellet from a solid homogenous mixture of organic powders for thermal physical vapor deposition with a reasonable expectation of success. The motivation to do so is provided by Van Slyke who describes the various problems observed using powders for thermal physical vapor deposition to produce an organic layer on a substrate for use in an organic light-emitting device (paragraph [0009]). Thus, the claimed invention as a whole is rendered *prima facie* obvious over the combined teaching of the prior art.

As to claim 3, Shi teaches the use of an overlapping range of 0.5 to 50 mole percent of the dopant component in the mixture (paragraphs [0037] and [0062]). Further, Van Slyke et al. teach that any range of dopant material may be selected for forming the mixture (Figure 9, step 904).

As to claim 5, Shi teaches the organic materials being added to the solvent (paragraph [0033]).

As to claim 11, Shi in view of Van Slyke et al. teach forming a pellet by applying sufficient pressure to the mixture, but do not teach compacting the mixture in a range of pressures between 3,000 – 20,000 pounds per square inch. However, Van Slyke et al. do teach that powders have problems in their utilization in thermal physical vapor deposition due to having a relatively low density (paragraph [0009, lines 22-27]) and the fact that the material is difficult to heat due to low particle-to particle contact area

(paragraph [0009, lines 27-41]) and that these facts may have a negative impact on the ability to outgas the material due to an inability to uniformly heat the material (paragraphs [000, lines 27-57]). All these variables are a function of the pressure under which the powder is converted into a pellet. As such, pressure is a result effective control variable in forming a pellet that would have been readily optimized as is routinely practiced in the art.

Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi (European Patent Application 1 156 536; published November 21, 2001) as evidenced by the Compact Oxford English Dictionary in view of Van Slyke et al. (European Patent Application 1 274 136; published January 8, 2003) and further in view of Nguyen (U.S. Patent 5,821,019; issued October 13, 1998).

As to claims 4 and 6, Shi in view of Van Slyke et al. teach the method of claim 1 as discussed in the 103(a) rejection above but do not specify the “common solvent” or “combination of solvents” as being tetrahydrofuran and dichloromethane (Shi, paragraph [0033]).

However, Nguyen details the use of specific well-known solvents to improve the efficiency of mixing. He specifically cites tetrahydrofuran and dichloromethane as conventional organic solvents known in the art (col. 10 line 53 – col. 11. line 1).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to take the method of Shi in view of Van Slyke et al. for forming the homogeneous mixture of claim 1, while specifically using

tetrahydrofuran and dichloromethane as the solvents because one of ordinary skill would be motivated to find teachings regarding specific solvents to supplement the general teaching of Shi in view of Van Slyke et al. As taught by Nguyen, tetrahydrofuran and dichloromethane would have been obvious and conventional choices. Thus, the claimed invention as a whole was *prima facie* obvious over the combined teachings of the prior art.

Claims 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi (European Patent Application 1 156 536; published November 21, 2001) as evidenced by the Compact Oxford English Dictionary in view of Van Slyke et al. (European Patent Application 1 274 136; published January 8, 2003) and further in view of Valint, Jr. et al. (U.S. Patent 6,902,812; issued June 7, 2005; filed May 6, 2003).

Shi in view of Van Slyke et al. teach the method of claim 1 as discussed in the 103(a) rejection above, but do not provide details on the evaporative method to remove the solvent from the mixture. However, Valint, Jr. et al. teach a basic procedure for removing a solvent via evaporation. Valint, Jr. et al teach using a temperature of at least 50 °C (col. 18, line 5), while conducting the evaporation of the solvent under vacuum (col. 17 line 64), and under an inert gas (col. 18 line 7). Valint, Jr. et al. also teach that the time, temperature, and pressure conditions for solvent removal will vary depending on such factors as volatility of the diluent and the specific components (col. 17 line 67 – col. 18 line 4). As such, temperature and pressure are result effective control variables in solvent evaporation and would have been readily optimized as is

routinely practiced in the art. (See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)). Thus, the claimed invention as a whole is rendered *prima facie* obvious over the combined teachings of the prior art.

Claims 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi (European Patent Application 1 156 536; published November 21, 2001) as evidenced by the Compact Oxford English Dictionary in view of Van Slyke et al. (European Patent Application 1 274 136; published January 8, 2003) and further in view of Jamil et al. (U.S. Patent 6,440,587; issued August 27, 2002).

As to claim 8, Shi in view of Van Slyke et al. teach the method of claim 1 as discussed in the 103(a) rejection above, but do not teach the specific method of mixing to be employed. However, one of ordinary skill in the art would clearly understand the implied teaching that mixing the material could be performed by a magnetic stirrer, turbine stirrer, or ultrasonic horn as these are notoriously well known mixing techniques in the art.

For example, Jamil et al. teach an analogous method for mixing phosphor powders for producing a high-resolution phosphor screen on a substrate for use in a light-emitting device. Jamil et al. teach mixing the suspension with an ultrasonic probe/horn (col. 16, lines 35-37).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to combine the general teaching of mixing taught by Shi in view of Van Slyke et al. and employ an ultrasonic probe/horn, for example, as



taught by Jamil et al. because, as taught by Jamil et al., the ultrasonic horn/probe minimizes contact with the mixture in order to reduce contamination (col. 11, lines 35-38).

As to claim 12, Jamil et al. does not teach the frequency at which the ultrasonic probe/horn is to be operated. However, the degree of mixing is impacted by speed of the mixing device. If mixing were incomplete, the homogeneous mixture, as required by Shi in view of Van Slyke et al. would not be formed. As such, mixing speed is a result effective variable that would have been readily optimized as is routinely practiced in the art (See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)). Additionally, ultrasonic mixing probes/horns that operate in the claimed range are readily available commercially.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1 and 3-12 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

All claims are rejected.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 2003/0153109, Ghosh et al. teach forming an analogous pellet under a pressure of 3000 – 15,000 psig.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Wollschlager whose telephone number is 571-272-8937. The examiner can normally be reached on Monday - Thursday 7:00 - 4:45, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JU

Jeff Wollschlager  
Examiner  
Art Unit 1732

  
CHRISTINA JOHNSON  
PRIMARY EXAMINER  
5/31/06

May 15, 2006